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PROFILED RAIL AND ACCESSORIES USED AS A SUSPENSION DEVICE

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Profiled Rail and Accessories used as a Suspension Device**Field of the invention**

The invention relates to a profiled rail and accessories used as a suspension
5 device having carriers of different types, for example supports, shelves or
carrying arms, which can be fitted into the profiled rail. The articles which can be
suspended or set down on the support may be, for example, displayed goods,
items for commercial or private use, exhibits or decorative objects. The profiled
rail is fastened horizontally on a carrying structure, essentially in the form of a
10 rear wall or panel and rack components. The profiled rail can be utilized
individually as a fitting; it is possible, for example, for a display wall in a
commercial establishment to be fitted out with a plurality of such profiled rails.

Prior art

15 GB 2 224 923 discloses a horizontal rail with a plug-in slot which is widened
downward behind the access point and has a horizontal base in the widened
portion. An upwardly extending groove is formed in the vicinity of the bottom of
the slot, and a narrowing bead is positioned in front of this groove. In front of the
bead, the slot has a greater extent in the upward direction. Shelves or carrying
20 arms can be inserted, as carriers, into the horizontal rail, a tongue element
which is directed toward the plug-in slot being present on these shelves or
carrying arms for the purpose of engaging in the slot. The tongue element has
an upwardly directed nose at the front to complement the upwardly directed
groove in the horizontal rail. At the front end, the tongue element has a bevel on
25 its underside. When the shelf or the carrying arm is inserted, the front edge is
raised, while the tongue element is lowered. The tongue element can thus be
introduced into the slot, the bevel being in the vicinity of the bottom and the nose
ending up located below the groove. Once the shelf or carrying arm has been
positioned horizontally, the nose engages in the groove, with the result that a
30 horizontal drawing-out action is not possible. At the access point, the tongue
element is supported on the bottom edge of the slot. This horizontal rail has to
be inserted into a rear carrier, e.g. a wooden beam, and additionally covered at

the front with vertically attached panel elements. In this respect, the design involves high assembly outlay and is not particularly versatile.

WO 01/43599 discloses a suspension device having a horizontally fitted profiled rail with a passage which extends between a front entry point and a rear boundary. The passage has, at the top, a slope which slopes upward in the direction of the entry point and thus forms a top clearance. At the bottom, the passage has an inclination which is inclined downward in the direction of the boundary and thus forms a bottom clearance. The passage also has, at the top, an undercut which is positioned in front of the boundary, as seen in the direction of the entry point. The plug-in carrier has at least one tongue element which can be plugged into the passage of the profiled rail and has an upwardly directed hook which is intended for engaging in the undercut. As an alternative, the carrier is a shelf of which the rear border can be plugged into the passage of the profiled rail. This device has been successfully used for many years now, but there is a desire to extend it in functional terms.

Object of the invention

In view of the increased requirements, with the focus on functional diversity and originality of design, the object of the invention is to propose a profiled rail of the abovedescribed type and also accessories which extend the possibilities for use as a result of electric current being supplied. The intention is for the electrical installation to be accommodated in as space-saving and unobtrusive a manner as possible and to be capable of advantageous installation and versatile use.

Overview of the invention

The profiled rail is designed for a suspension device having carriers which can be plugged into the profiled rail and on which articles can be suspended or set down. The profiled rail is intended for fastening horizontally on a carrying structure and has a passage which extends into the profiled rail, in principle horizontally, from a front entry point. Arranged within the profiled rail is a conductor rail with current conductors which is supplied with electricity via a power supply. The current conductors are accessible from the passage for the

purpose of tapping electricity for supplying a consuming unit which can be connected via a feed line.

The following features concern specific configurations of the profiled rail: The
5 conductor rail comprises an insulating profile and current conductors which are
accommodated in wire channels and can be tapped via access points at least
more or less over the entire axial extent of the current conductors and in at least
largely uninterrupted manner. The conductor rail is arranged in a current-
conducting groove which extends from the passage. The insulating profile of the
10 conductor rail has outer contours which fit into complementary inner contours of
the current-conducting grooves. The current-conducting groove is arranged,
remote from the entry point, in the depth of the passage and, in principle,
perpendicularly to the latter. The access points open, in principle,
perpendicularly to the passage. The insulating profile has an M-shaped cross
15 section in principle. The two access points are each located at the bottom within
the side legs of the M-shaped cross section. The wire channels with the current
conductors provided therein are each located at the top within the side legs, in
the profile tips. The current conductors can be tapped by an adapter which can
be pushed into the passage.

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The end of the passage is defined by a base plate. The base plate has a top
extension extending upward and a bottom extension extending downward,
beyond the region of the incoming passage. Adjacent to the base plate, a hook
groove extends upward, and an arresting groove extends downward, out of the
25 passage. The passage is bounded at the top by a top strut and at the bottom by
a bottom strut. At the top, the passage has a slope which slopes upward in the
direction of the entry point and thus forms a top clearance. At the bottom, the
passage has an inclination which is inclined downward in the direction of the
base plate and thus forms a bottom clearance. In the bottom strut, in the vicinity
30 of the entry point, a strip groove is provided for accommodating a non-slip and
damping, preferably elastic extruded profile. Arranged at the end of the passage
is an axially accessible raised molding, extending along the profiled rail, for
tapping the ground contact of the adapter.

Furthermore, the profiled rail has a supporting strut which extends from the bottom strut, opens out into the bottom extension and encloses a cavity with the bottom strut. Located on the top strut is a downwardly extending tongue with a
5 tongue groove located alongside it. Provided on the bottom strut is a downwardly extended tongue with a tongue groove located alongside it. In each case one screw-connection channel is provided in the region where the supporting strut extends from the bottom strut and in the region where the top strut opens out into the base plate. A notched line is provided as a marking
10 preferably on both sides of the top extension. The tongue strips are intended for being accommodated in tongue grooves which are present in the edges of attached panels. The notched lines serve as an orientation means for screw holes which may optionally be provided, and can be utilized in order for the construction comprising the carrying structure with one or more profiled rails
15 being introduced to be fastened directly or indirectly on a part of a building.

The power supply is formed, in the first instance, by a cutout on the profiled rail, into which a connection terminal is inserted. The power supply also includes a plug coupling comprising a bushing, which is positioned in the cutout alongside
20 the connection terminal, and a plug, which can be coupled to the bushing from the outside and to which the current-supplying feed line is connected. Finally, the power supply includes a ground terminal on the profiled rail.

The carrier has, when in the form of a carrying arm, at the plug-in end of the bar part, at least one tongue element which can be plugged into the passage of the
25 profiled rail and has a bottom tapered portion and an upwardly directed hook which is intended for engaging in the hook groove. As an alternative, the carrier is in the form of a shelf of which the rear edge can be plugged into the passage of the profiled rail. The adapter can be pushed separately into the passage for
30 power take-off or, inserted into an aperture of a shelf, can be pushed into the passage together with the shelf.

The adapter has, in the first instance, a rotatable pin and, on the input side, contact lugs which can be pivoted on the rotatable pin and are intended for power take-off from the current conductors, and a tap for the grounding conductor. Located on the output side are line connections and a ground-contact
5 connection, which are connected to a feed line to a consuming unit. The adapter further comprises a housing with a bottom plate, a cover, an output connector and an optional plate groove in the housing for insertion into the aperture of a shelf. The output connector merges into a conduit for further cable routing to the consumer. A rotary knob, which is accessible to the user and connected to the
10 pin, is provided on the adapter. The housing contains a pin bearing, and an inhibitor acts on the pin. Seated on the pin is a catch which, in the connected state, when the contact lugs butt against the current conductors, engages at least in one of the grooves. In the disconnected state, the catch is disengaged, with the result that the adapter can be pushed into the passage or drawn out of
15 the passage.

The adapter is provided, in particular, for use with the abovedescribed profiled rail, but constitutes a subject matter of the invention which is independent from this profiled rail.

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Brief description of the attached drawings

In the drawings:

Figure 1A: shows a perspective view of a profiled rail;

Figure 1B: shows the illustration according to Figure 1A, this time in vertical
25 section;

Figure 1C: shows a perspective view of a separate conductor rail from the profiled rail according to Figure 1A;

Figure 1D: shows the illustration according to Figure 1C, this time in cross
section;

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Figure 2A: shows a perspective view of the profiled rail according to Figure 1A with a cutout for the power supply and a panel attached;

- Figure 2B: shows the illustration according to Figure 2A with a connection terminal inserted;
- Figure 2C: shows the illustration according to Figure 2B with a plug coupling separated;
- 5 Figure 2D: shows the illustration according to Figure 2C with the plug coupling connected;
- Figure 3A: shows a perspective view of an adapter in the *locked, connected position*;
- 10 Figure 3B: shows the illustration according to Figure 3A without a cover;
- Figure 3C: shows a separate rotary knob with pin and contacts from Figure 3B;
- Figure 3D: shows a perspective view of the adapter according to Figure 3A in the *unlocked, disconnected position*;
- 15 Figure 3E: shows the illustration according to Figure 3D without the cover;
- Figure 3F: shows the separate rotary knob with pin and contacts from Figure 3E;
- Figure 4: shows a perspective view of a modified adapter according to
- 20 Figure 3A in the *unlocked, disconnected position*, without a plate groove in the housing;
- Figure 5A: shows, in detail form, the adapter according to Figure 4 inserted into the profiled rail according to Figure 1A, with a panel attached;
- 25 Figure 5B: shows the lateral overall view of the illustration according to Figure 5A;
- Figure 5C: shows the illustration according to Figure 4A in section along line E-E;
- 30 Figure 6A: shows a perspective view of the adapter according to Figure 3A inserted into a shelf;
- Figure 6B: shows, in the form of an enlarged detail, the illustration according to Figure 6A, the adapter having no cover;
- Figure 6C: shows, in the form of an enlarged detail, the illustration according
- 35 to Figure 6B, the adapter having the cover attached;

- Figure 7A: shows a different perspective view of the illustration according to Figure 6A with a luminaire fitted beneath the shelf;
- Figure 7B: shows, in the form of an enlarged detail, the illustration according to Figure 7A with the adapter;
- Figure 8A: shows, in vertical section, the shelf with the adapter according to Figure 6A inserted into a profiled rail according to Figure 1A and in the *unlocked, disconnected position*;
- Figure 8B: shows the illustration according to Figure 8A, this time with the adapter in the *locked, connection position*;
- Figure 8C: shows the illustration according to Figure 8B in completed form with the power supply, the luminaire and the panel attached; and
- Figure 9: shows, in vertical section, a profiled rail according to Figure 1A with a panel attached and a carrying arm plugged in.

Exemplary embodiment

With reference to the attached drawings, the detailed description of an exemplary embodiment of the profiled rail according to the invention and the accessories used with the adapter will be given hereinbelow.

The following applies to the rest of the description. If, in order to avoid ambiguity in the drawings, a figure contains designations which are not explained in the directly associated text of the description, then you are referred to the point at which they are mentioned in previous or subsequent descriptions of the figures. For reasons of clarity, components are not usually designated again in further figures, provided that it is clear from the drawings that they are "recurring" components.

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The profiled rail 1 is provided for a suspension device having carriers 6,8 which can be plugged into the profiled rail 1 and on which articles can be suspended or set down, the profiled rail 1 being intended for fastening horizontally on a carrying structure 9, by way of a passage 10 which extends into the profiled rail

1, in principle horizontally, from a front entry point **100**. Arranged within the profiled rail **1** is a conductor rail **2** with current conductors **24,27** which is supplied with electricity via a power supply **3**. The current conductors **24,27** are accessible from the passage **10** for the purpose of cutting electricity for
5 supplying a consuming unit **7** which can be connected via a feed line **46**. The conductor rail **2** comprises an insulating profile **20** and current conductors **24,27** which are accommodated in wire channels **22,25** and can be tapped via access points **23,26** at least more or less over the entire axial extent of the current conductors **24,27** and in at least largely uninterrupted manner. The conductor
10 rail **2** is arranged in a current-conducting groove **15** which extends from the passage **10**.

The insulating profile **20** of the conductor rail **2** has outer contours **21** which fit into complementary inner contours on the current-conducting groove **15**. The
15 current-conducting groove **15** is arranged, remote from the entry point **100**, in the depth of the passage **10** and, in principle, perpendicularly to the latter. The access points **23,26** open, in principle, perpendicularly to the passage **10**. The insulating profile **20** has an M-shaped cross section in principle. The two access points **23,26** are each located at the bottom within the side legs of the M-shaped
20 cross section. The wire channels **22,25** with the current conductors **24,27** provided therein are each located at the top within the side legs, in the profile tips. The current conductors **24,27** can be tapped by an adapter **4** which can be pushed into the passage **10**.

25 The end of the passage **10** is defined by a base plate **11** which has a top extension **110** extending upward and a bottom extension **113** extending downward, beyond the region of the incoming passage **10**. Adjacent to the base plate **11**, a hook groove **16** extends upward, and an arresting groove **17** extends downward, out of the passage **10**.

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The passage **10** is bounded at the top by a top strut **13** and at the bottom by a bottom strut **12**. The passage **10** has:

- a) at the top, a slope which slopes upward in the direction of the entry point **110** and thus forms a top clearance **101**,
- b) at the bottom, an inclination which is inclined downward in the direction of the base plate **11** and thus forms a bottom clearance **102**,
- 5 c) in the bottom strut **12**, in the vicinity of the entry point **100**, a strip groove **18** for accommodating a non-slip and damping, preferably elastic extruded profile **180**; and
- d) at the end of the passage **10**, an axially accessible raised molding **103**,
10 extending along the profiled rail **1**, for tapping the ground contact **44** of the adapter **4**.

The profiled rail **1**, furthermore, has:

- a) a supporting strut **14** which extends from the bottom strut **12**, opens out into the bottom extension **113** and encloses a cavity **114** with the bottom
15 strut **12**;
- b) on the top strut **13**, a downwardly extending tongue **130** with a tongue groove **131** located alongside it;
- c) on the bottom strut **12**, a downwardly extending tongue **120** with a tongue groove **121** located alongside it;
- 20 d) in each case one screw-connection channel **115,111** in the region of a supporting strut **14** extends from the bottom strut **12** and in the region where the top strut **13** opens out into the base plate **11**;
- e) on the top extension **110**, a notched line **112**, preferably on both sides, has a marking;
- 25 f) the tongue strips **120,130** are intended for being accommodated in tongue grooves **920** which are present in the edges of attached panels **9**;
- g) the notched lines **112** serve as an orientation means for screw holes which may optionally be provided, and can be utilized in order for the construction comprising the carrying structure **9** with one or more profiled rails **1**
30 introduced to be fastened directly or indirectly on a part of a building.

The power supply **3** is formed by:

- a) a cutout **19** on the profiled rail **1**, into which a connection terminal **30** is inserted;
- b) a plug coupling **31** comprising a bushing **33**, which is positioned in the cutout **19** alongside the connection terminal **30**, and a plug **32**, which can be coupled to the bushing **33** from the outside and to which the current-supplying feed line **320** is connected; and
- c) a ground terminal **34** on the profiled rail **1**.

- 10 The carrier **8,6** has, when in the form of a carrying arm **8**, at the plug-in end **801** of the bar part **80**, at least one tongue element **81** which can be plugged into the passage **10** of the profiled rail **1** and has a bottom tapered portion **83** and an upwardly directed hook **82** which is intended for engaging in the hook groove **16**. As an alternative, the carrier **6** is in the form of a shelf of which the rear edge **60** can be plugged into the passage **10** of the profiled rail **1**.

The adapter **4** can be pushed separately into the passage **10** for power take-off or, inserted into an aperture **61** of a shelf **6**, can be pushed into the passage **10** together with the shelf **6**. The adapter **4** comprises:

- a) a rotatable pin **410**;
- b) on the input side:
 - ba) contact lugs **42,43** which can be pivoted on the rotatable pin **410** and are intended for power take-off from the current conductors **24,27**; and
 - bb) a tap **44** for the grounding conductor; and
- c) on the output side:
 - ca) line connections **420,430** and a ground-contact connection **440**, which are connected to a feed line **46** to a consuming unit **7**.

The adapter **4** also comprises:

- a) a housing **40** with a bottom plate **400**, a cover **401**, an output connector **402** and an optional plate groove **403** in the housing **40** for insertion into the aperture **61** of a shelf **6**, the output connector **402** merging into a conduit **460** for further cable routing to the consuming unit **7**;

- b) a rotary knob **41**, which is accessible to the user and is connected to the pin **410**;
- c) a pin bearing **411** in the housing **40**, and an inhibitor **412** acting on the pin **410**; and
- 5 d) a catch **45**, which is seated on the pin **410** and, in the connected state, when the contact lugs **42,43** butt against the current conductors **24,27** engages at least in one of the grooves **16,17**; it being the case that
- e) the catch **45**, in the disconnected state, is disengaged, with the result that the adapter **4** can be pushed into the passage **10** or drawn out of the
- 10 passage **10**.